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### ABSTRACT

Two studies were undertaken within the framework of learning set or learning-how-to-learn methodology, with comparable sets of stimuli which varied from trial to trial rather than remaining constant. Two randomly assigned groups of tenth grade students used a different four-word set of difficult vocabulary items each day for 15 days. Time taken for the exercise and an achievement score provided two dependent variables. Two instructional methods were used: matching words to synonyms, and reading and rewriting definitions. In the first study students worked with one method for ten days, switched to the other for three and returned to the original for two. In the second study, students used the same method throughout. Results, illustrated by graphs, showed that students performed better in terms of achievement and time as practice continued. The synonym method appeared to be the more interesting, though not necessarily the better, of the two and provided immediate feedback to the student. Study 1 proved to be biased against the definition group, and the achievement test was changed in Study 2 to a sentence completion approach to be fair to both groups. The exploration of a wider variety of criteria is recommended for future studies. (MBM)

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Investigation of Learning-How-To-Learn (LHL) in  
A Classroom Situation

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The two studies reported here were designed within the framework of learning set or learning-how-to-learn (LHL) methodology. In these types of learning studies, comparable sets of stimuli vary from trial to trial rather than remaining constant.

The material to be learned was 15, four-word sets (a total of 60 different words) of difficult vocabulary items. [A list of the words is attached in Appendix 1.] Two different instructional methods were utilized--a synonym (SYN) method whereby students learned meanings by matching learning words to appropriate synonyms, and a definition (DEF) method which required the reading and rewriting of definitions. A brief example of each type of material is shown in Table 1.

Both studies used tenth grade students. Classroom sections were randomly assigned to either the SYN or DEF materials. The general procedure involved administering a different four-word set of material each day for three weeks. On a given day, a student would record the time that he began working on the learning exercise, proceed to work through the booklet, and then record the time he finished. After all material had been collected, a short three minute achievement test over the four words was given. Therefore, there were two dependent variables--the amount of time required to work through the booklet and an achievement score.

In Study I, students worked on either SYN or DEF material for the first ten days, then were switched to the other type of material for the next three days, and then returned to the original method for the last two days. The criterion achievement test consisted of writing down as many synonyms as possible in the time limit. Figures 1 and 2 present the achievement and time data respectively. In the SYN group, there was a significant increasing trend (by plotting orthogonal polynomials through the means) in achievement. Note the drop-down (up for DEF) effect when they were switched over to the DEF materials on days 11 - 13. No such day-by-day increasing trend was found in the DEF group. One drawback in this study was the fact that the criterion achievement test was clearly biased in favor of the SYN group. As for the time measure, there was a significant decreasing trend in the SYN group but not in the DEF group.

In Study II, the procedure was similar except that there was no switch-over period--that is, students used the same instructional method for 15 days. The criterion achievement test was changed from producing synonyms to adding a short phrase to complete a sentence about the learning words. It was hoped that this would be fairer to both SYN and DEF groups. Figures 3 and 4 present the achievement and time data for Study II. [Standard deviations for both achievement and time scores for both studies are presented in Appendix 2.] There were significant increasing trends in achievement

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For more information about either of these studies, please write to:  
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TABLE 1

Example Set of SYN and DEF Material

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SYN<sup>1</sup>

Tractive, Gauche, Lissome, Surreptitious

- |    |       |           |
|----|-------|-----------|
| 1. | _____ | Drawing   |
| 2. | _____ | Clumsy    |
| 3. | _____ | Pliable   |
| 4. | _____ | Secretive |
| 5. | _____ | Customer  |

DEF<sup>2</sup>

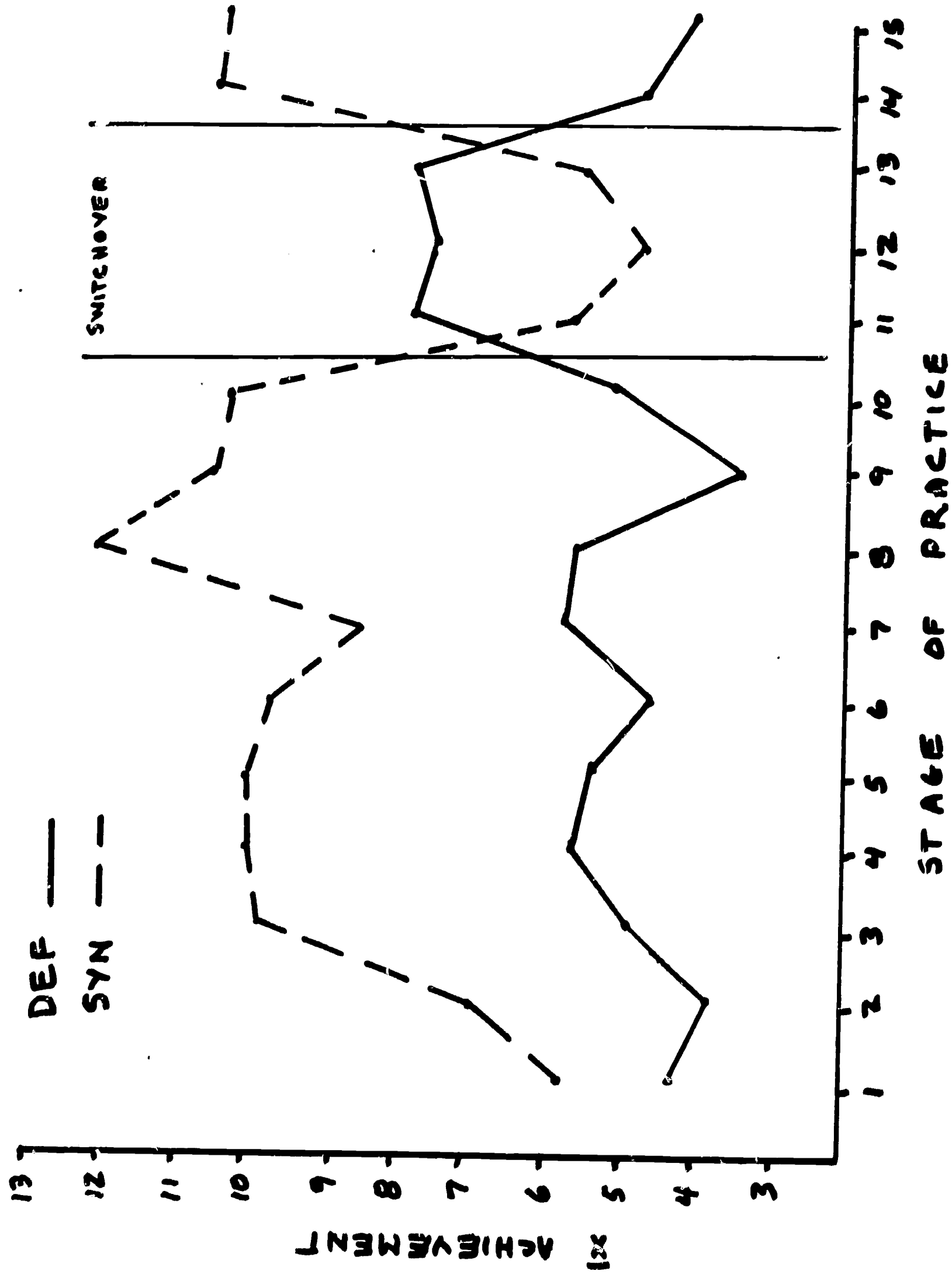
Tractive

Heavy weights are often moved by using some kind of tractive device which makes it easier for people to accomplish their task. Thus tractive refers to a pulling or hauling capability of something.

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<sup>1</sup>One of six pages in the booklet.

<sup>2</sup>Definition for one of the four words.



**FIGURE 1**

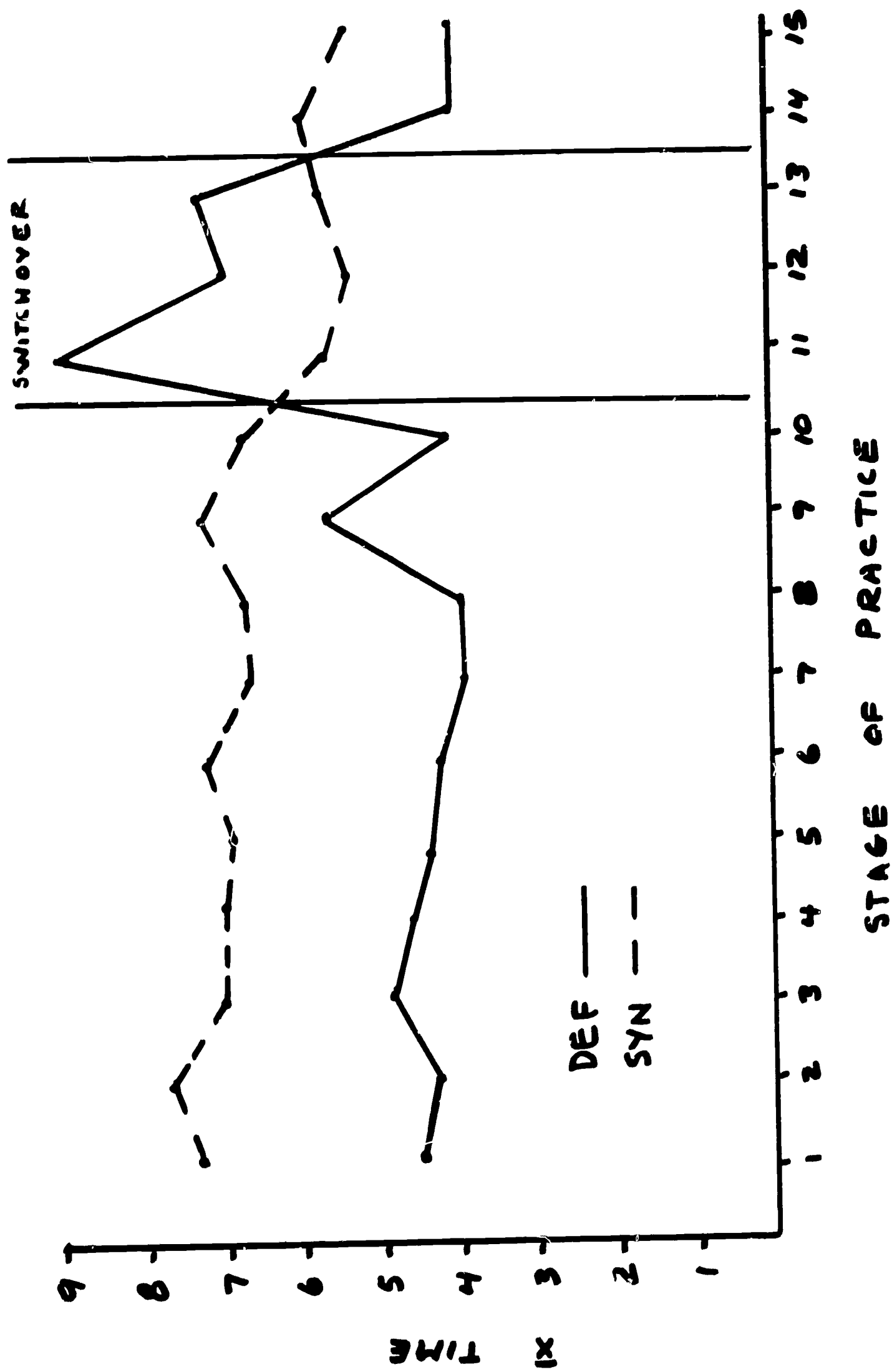


FIGURE 2



FIGURE 3

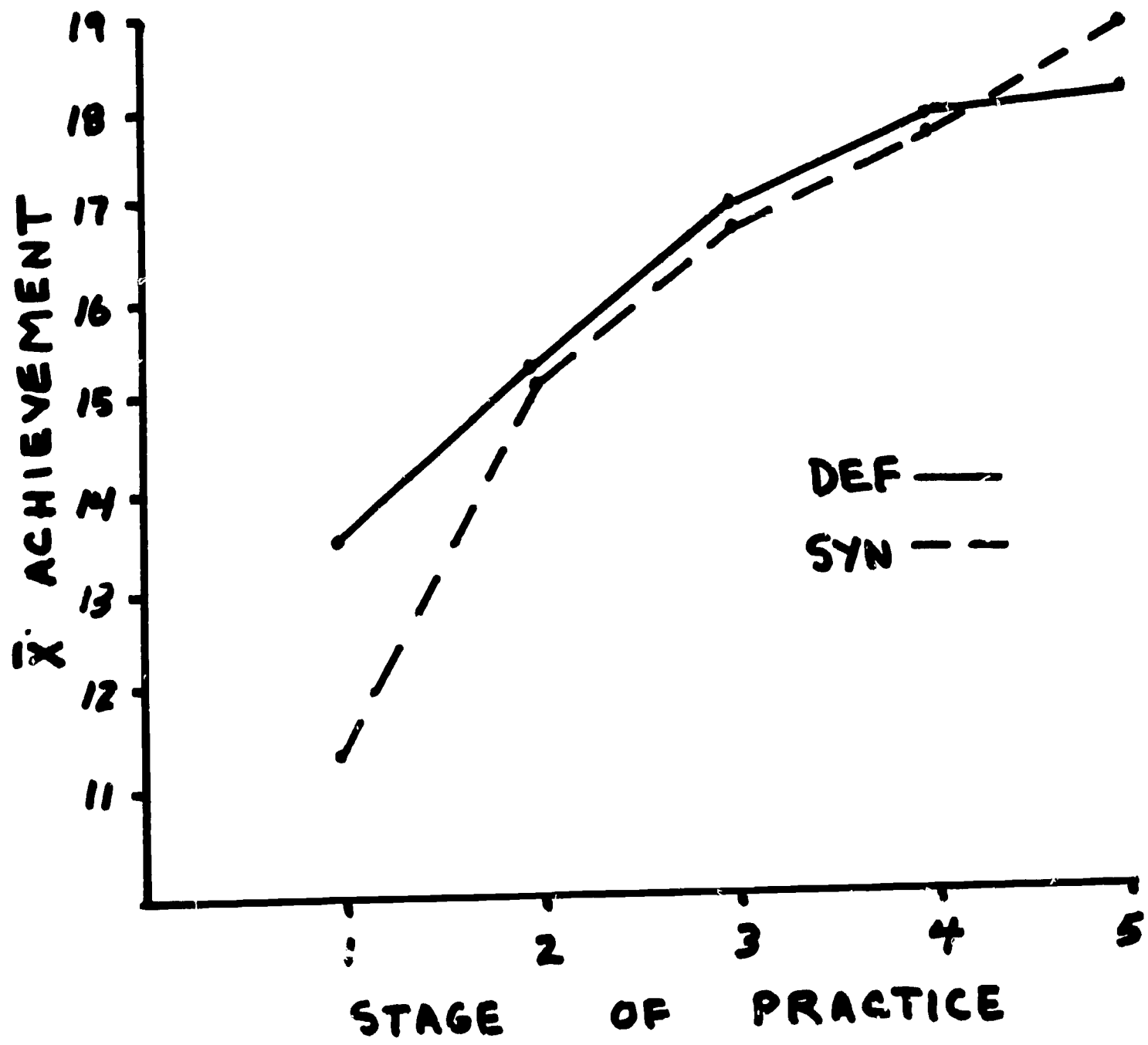
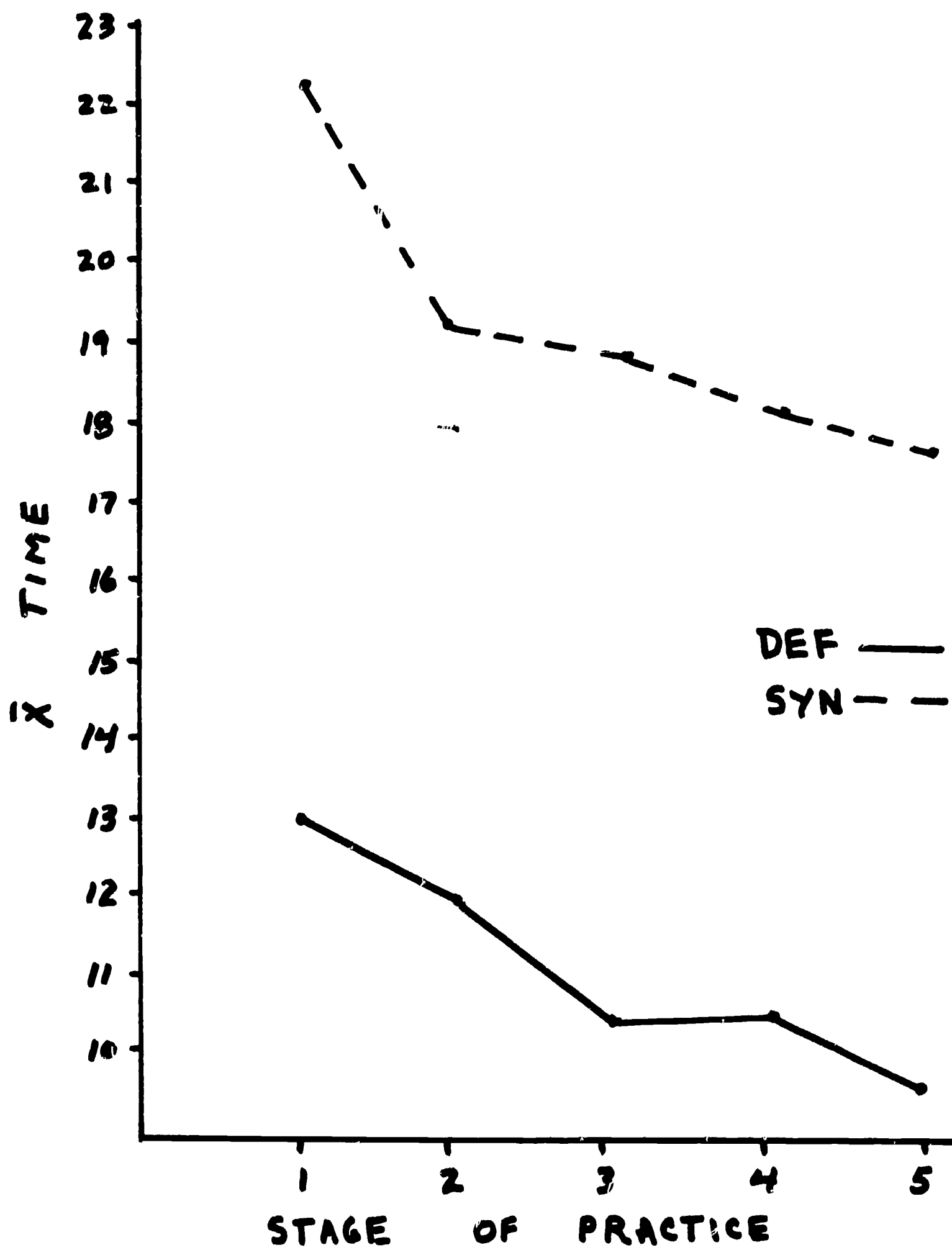


FIGURE 4





and decreasing trends in time. Note that the achievement curves are similar for both SYN and DEF groups.

In order to further examine the changes in criterion achievement performance in Study II, separate curves based on total scores for days 1-3 were plotted across blocks of days for the top, middle and bottom groups for the SYN and DEF methods. Of interest here was whether the learning pattern would be similar for all groups. Figures 5 and 6 present this data. For both sets of curves, convergence seems to occur across blocks of days. The high achievers seemed to change little as compared to the middle and low groups. One is tempted to suggest that the instructional methods acted as equalizers, especially in the SYN group. However, because of the ceiling effect and inevitable regression effect, such a conclusion will have to wait further research.

In conclusion, there are several points of interest that should be cited. First, and foremost, we think that LHL has been demonstrated in these studies. Using the appropriate methodology, students performed better both in terms of achievement and time as practice continued. While we make no claims that our studies were airtight, we were happy to see orderly changes in vocabulary performance occur while students were in actual classroom situations. We hope that more future research will emphasize the demonstration of behavior changes in the regular routine of school activity.

Second, the SYN method seems to be the more interesting of the two instructional techniques presently used. It was set up more like programmed instruction providing immediate feedback to the student. It is not claimed that SYN was the better method of the two. And this leads to the third point. It seems likely that there is an interaction between method of instruction and method of criterion measurement. That is, instructional method X may be a better learning approach only when a particular criterion is used. We found in Study I, for example, that a synonym production method which was good for the SYN group was biased against the DEF group. In Study II, we found that the sentence completion approach was fair to both groups but produced ceiling effects. You win some and lose some. Therefore, we also urge future researchers in this area to explore a variety of criteria in their studies.

And finally, we also learned from these studies--we learned that some tenth grade students can't tell time. How some of them could finish the booklet of material before they started--I don't know, but their recorded responses indicated that they did.

FIGURE 5

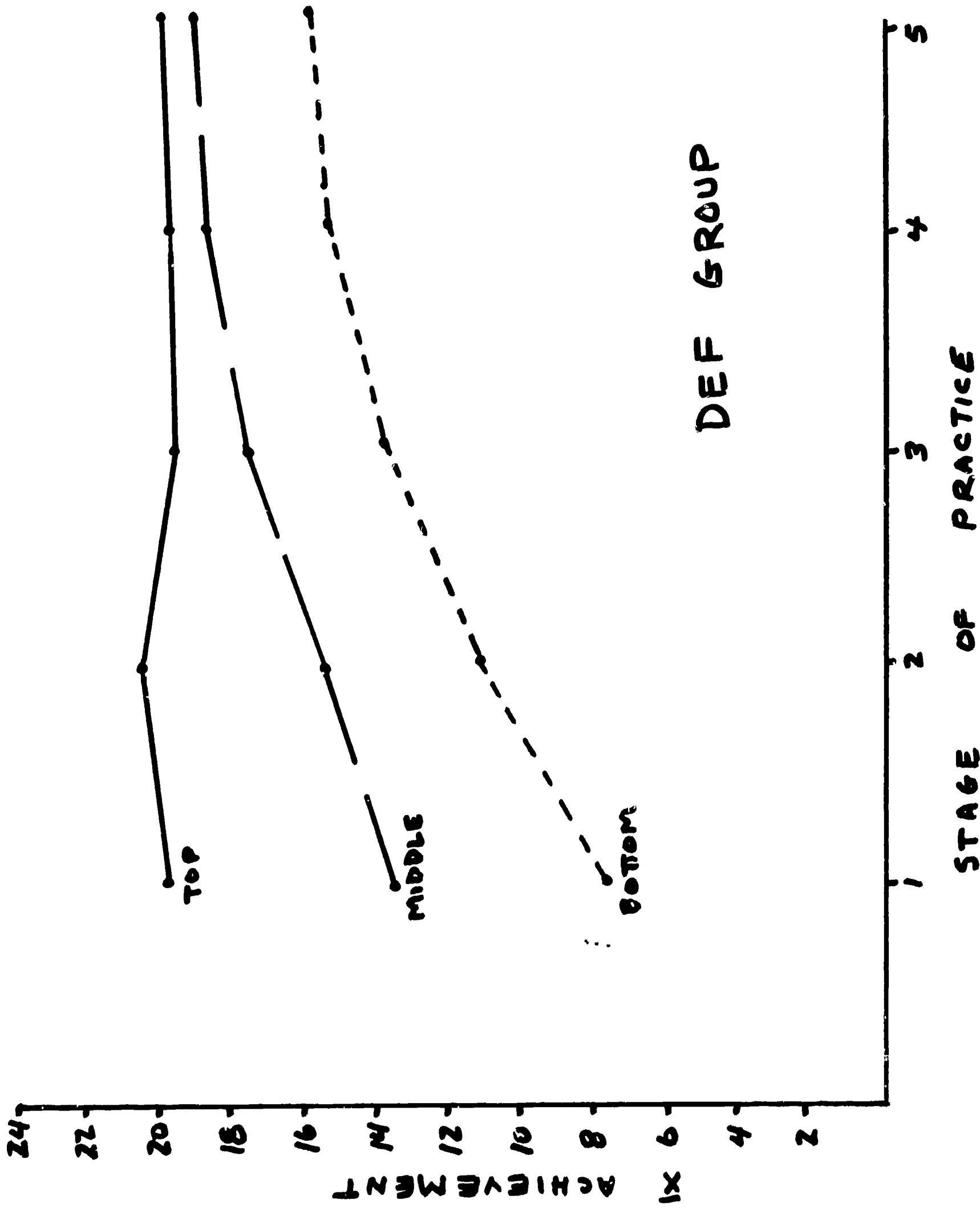
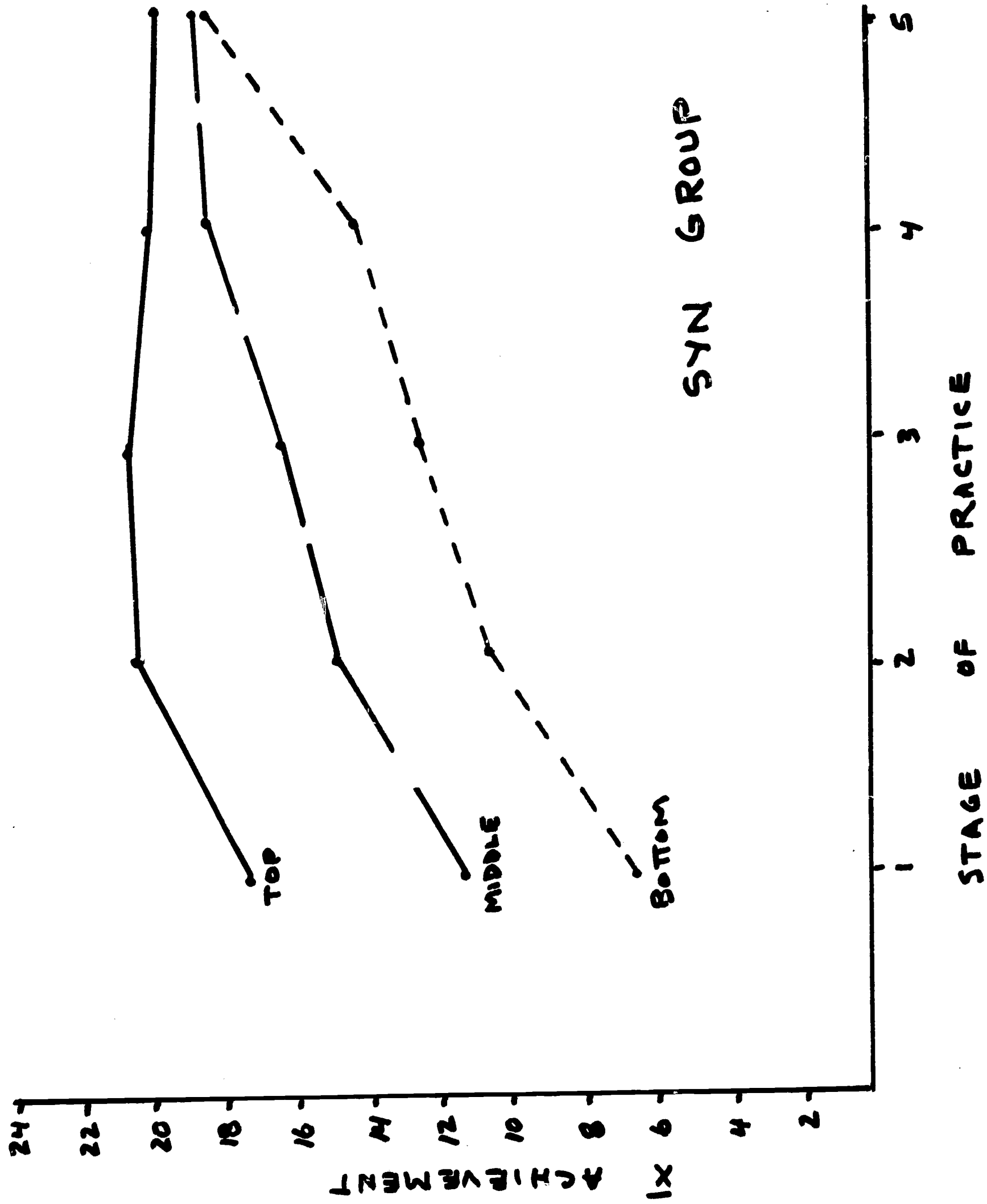


FIGURE 6



APPENDIX 1  
LIST OF SIXTY VOCABULARY WORDS USED

Set 1

- a. Tractive
- b. Lissome
- c. Gauche
- d. Surreptitious

Set 2

- a. Juxtapose
- b. Acumen
- c. Inveigh
- d. Celerity

Set 3

- a. Rancid
- b. Antipodal
- c. Explication
- d. Limpid

Set 4

- a. Taxonomy
- b. Parturition
- c. Alacrity
- d. Chivalrous

Set 5

- a. Aberration
- b. Paroxysm
- c. Sinuous
- d. Reciprocation

Set 6

- a. Boorish
- b. Mediate
- c. Delineate
- d. Endemic

Set 7

- a. Asseverate
- b. Perspicacity
- c. Tenuous
- d. Redaction

Set 8

- a. Vapid
- b. Ignominious
- c. Tensity
- d. Paradigm

Set 9

- a. Nascent
- b. Mordant
- c. Abrogate
- d. Confabulate

Set 10

- a. Salubrious
- b. Callow
- c. Inane
- d. Duress

Set 11

- a. Derogate
- b. Parity
- c. Ductility
- d. Succinct

Set 12

- a. Urbanity
- b. Stripling
- c. Cogitate
- d. Primordial

Set 13

- a. Heterogeneous
- b. Maudlin
- c. Banal
- d. Volant

Set 14

- a. Vivify
- b. Remiss
- c. Altercation
- d. Exacerbate

Set 15

- a. Optimum
- b. Dissonant
- c. Lethargic
- d. Eclectic

## APPENDIX 2

### Standard Deviations for Criterion Measures

#### STUDY I

Day	DEF		SYN	
	ACH	TIME	ACH	TIME
1	3.30	1.43	4.56	2.07
2	2.79	1.67	6.06	2.04
3	2.73	2.27	5.97	2.41
4	3.69	1.96	5.42	2.76
5	3.51	2.09	6.05	2.40
6	4.02	1.92	6.07	2.34
7	3.58	1.44	5.15	2.36
8	3.69	1.90	5.88	2.67
9	2.75	1.86	5.80	2.86
10	4.33	1.94	6.54	2.80
11	Standard Deviations for switchover period			
12				
13	not available			
14	3.94	1.87	6.44	2.10
15	3.19	2.02	5.93	2.09

#### STUDY II

Block	DEF		SYN	
	ACH	TIME	ACH	TIME
1	5.44	3.13	4.66	3.06
2	5.27	3.00	4.47	3.01
3	4.23	2.85	4.28	3.32
4	4.17	2.75	3.46	3.46
5	4.12	2.87	2.90	2.78

## References

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